

CLAIMS

I claim:

1. A transport and splicing apparatus under the control of a computer, for supplying successively used rolls of web material to at least one web utilizing
 - 5 device from the roll unwinding devices associated therewith, as an uninterrupted, continuously feeding web, by splicing said web from an at least partially depleted dispensing first roll of web material in said unwinding device, to a replacement second roll supplied by said transport and splicing apparatus
 - 10 consisting essentially of :
coreshaft means rigidly assembled into the central cores of said first roll and said second rolls, hereinafter referred to as the "first roll assembly" and the "second roll assembly" respectively.
a roll transport vehicular means, engaged by supporting an operative roll positioning
 - 15 means for rotatably engaging and positioning said second roll coreshaft means assembly into a predefined spatial relation to said dispensing first roll of material, a driving means for operatively controlling the rotation of said second roll assembly, an operative splicing and web-severing means attached to said roll transport vehicular means by a pair of articulated arm means,
 - 20 operative arm means supported by said roll transport vehicular means, to engage and remove the said first roll assembly from said unwind device, said operative roll positioning means thereafter moving said second roll assembly into the former position of said first roll assembly in said unwind device, thereby converting said replacement second roll into a dispensing first roll.
- 1 2. A roll transport vehicular means consisting essentially of:
a transport vehicle including a frame structure, computer controls and sensors, operator controls, battery, operative roll positioning means, operative roll rotation means, splicing and severing means, a roller, roller positioning means, and
 - 5 supporting wheels,
acting in combination to transport a second roll of material from a storage location into a predefined spatial relation with a first dispensing roll in an unwind device, and adapted to perform a flying splice with said first roll, and
to thereafter replace said first roll with said second roll.

3. The apparatus in claim 1 wherein said an operative roll positioning means attached to said roll transport vehicular means consists consisting essentially of:
a pair of gripper bars, each gripper bar supporting an operative coreshaft gripper,
one gripper disposed at a first end of said coreshaft,
5 and one gripper disposed at a second end of said coreshaft,
to engage and position said second roll coreshaft assembly,
while allowing said coreshaft second roll assembly to rotate about its axis,
where each of said gripper bars is operatively positioned by actuators and levers
responsive to signals from said computer,
10 the circumferential outer surface of said second roll assembly thereby being moved into
proximal juxtaposition with said dispensing first roll,
prior to the beginning of the splice cycle.

4. The apparatus as described in claim 1, wherein the driving means to control the rotation of said second roll consists of:
an electronic motor-drive means responsive to a speed-signal calculated by said computer primarily based on the arithmetic quotient of, the indicated web
5 utilization velocity from a web velocity sensor ~~located on the web utilizing device~~,
divided by the indicated diameter of said second roll from a sensor located on said transport and splicing apparatus,
said a motor being provided with a rotary drive means coupled to said coreshaft to operatively control the rotation of said coreshaft,
10 so disposed that said motor rotates said second roll at a surface velocity approximating the web utilization velocity during the time before the splice cycle,
and during the time after the splice cycle,
said motor-drive signal from said computer generally being a braking-torque
15 signal based on the indicated web tension to the computer from a sensor preferably located in said web utilizing device,
whereby the rotational velocity of said second roll regulates an essentially constant web tension during and after the splice cycle.

5. The apparatus as described in claim 1 wherein said splicing and web-severing means consists essentially of:

a pair of pivoted, spaced and parallel splicing arms, attached to said transporting and splicing apparatus,

5 said apparatus also supporting operative actuators to position each of said splicing arms,

each arm supporting an operatively pivoted bracket,

said brackets supporting a first and second end of an operatively rotatable idler roller shaft,

10 said roller shaft supporting on bearings a rotatable idler roller,

said roller being so disposed as to redirect the path of web of said dispensing first roll of material during the splice cycle so that said dispensing web contacts the outer circumferential surface of said second first roll to cause an adhesive area on the outer wrap to be forcibly contacted by said dispensing web,

15 thereby forming a splice, and

said roller shaft also having clamped rigidly thereto at each end,

a pair of clamping blocks supporting a web severing means,

said severing means being comprised of an elongated, serrated blade each end of which is rigidly attached to said blocks

20 to operatively sever the spliced webs dispensing web simultaneously and in combination from said dispensing first and second rolls of material, from said first roll splice.

6. The apparatus as described in claim 1, wherein the means to remove said first second roll after the splicing cycle consists essentially of:

a pair of splicer arms adapted to support and position each end of said splicing and severing mechanism into parallel proximal juxtaposition to said second roll,

5 and also to pivotably support and position a pair of splicing roller brackets,

said brackets rotatively supporting a splicing roller,

said splicing roller being adapted to redirect the path of the unwinding dispensing web, such that the web contacts said second first roll, thereby forming a splice,

and after the splice cycle is completed,

10 said roller and said bracket assembly grasps said first second roll and the coreshaft located therein,

12 the pair of splicer arms thereafter being moved in a path such that said roller and bracket assembly in combination with said first second roll supported thereby, are removed from said unwind device.

7. The apparatus as described in claim 1, including computer operative means for automatically aligning the supporting mechanism of said first roll with said second roll such that the center-lines of said first roll and said second roll are parallel and the faces of both rolls are coplanar.

8. The apparatus as described in claim 1, including an elevating mechanism being provided to raise the carriage which supports:

a roll positioning means,
a driving means for operatively controlling the rotation of said second roll assembly,
a splicing and web-severing means,
and means to engage and remove said first roll assembly from said unwind device after the first roll has been spliced to the second roll ,
~~roller supporting, loading, splicing and core retrieval mechanisms~~
such that upper levels of a multilevel unwind device may be serviced by said apparatus

9. The apparatus as described in claim 1 including signal broadcasting and receiving means attached to said vehicular means and the web utilizing device, to provide operational information including, ~~but not limited to,~~ web utilization speed, the diameters of the dispensing rolls, and emergency stops, and to automatically guide said vehicular means into a predetermined spatial relation to said unwinding devices.

10. The apparatus as described in claim 1 wherein a sequence of rolls of material having a variety of characteristics may be successively supplied to a variety of web utilizing devices.

11. The apparatus as described in claim 1, wherein the coreshaft means is comprised of: a pair of selectively operative core chucks, internally engaging said rolls of material in the center of each end of said second roll, said chucks being selectively engaged and supported by a pair of spaced, parallel, 5 and operatively pivoted chuck arms, said chuck arms being so disposed as to operatively place said chucks into the center of said second rolls, whereby said operative arm means may subsequently engage, lift and position said second rolls during the transport, splicing, and positioning of said second rolls into a 10 pair of rotatable engagement means in said unwind device, so disposed at each end of said rolls as to rotatably engage said chucks, and after said first rolls are spliced, said chuck arms are so disposed as to engage and remove said first roll assembly from said unwind device, said operative arm means thereafter moving said second roll assembly into the former 15 position of said first roll in said unwind device, thereby converting said replacement second roll into a dispensing first roll.

(Claim 12 added)

12. The apparatus as described in claim 1, wherein the method and means to remove said first roll assembly after the splicing cycle consists essentially of: a pair of splicer arms supported by said transport and splicing apparatus adapted to support and position each end of said first roll assembly, 5 said pair of splicer arms thereafter being moved in a path such that said first roll supported thereby is raised above the roll transport and splicing apparatus, said roll transport and splicing apparatus including said splicer arms then being moved to a location remote from the web utilizing device, said pair of splicer arms then being lowered to a convenient height for removal by an 10 operator or automatic means, the core gripping means then being selectively operatively released, thereby discharging the coreshaft and expired roll assembly from said splicer arms.